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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/583,230

Filing Date: June 16, 2006

Appellant(s): JOUSSE, FABIEN FREDERIC

Michael Aronson
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 09/16/2010 appealing from the Office action
mailed 06/24/2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

1, 4, 5, 13 & 14 rejected

7-12 withdrawn

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. 35 USC § 103 rejections in view

of Anderson et al. (PG Pub 2003/0053934) for claims 1, 4, 5, 13 & 14 & 35 USC § 103 rejections in view of Ghosh et al. (US 5993750) for claims 1, 4, 5, 13 & 14.

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

WO 01/28670 A1 ALLEN 04-2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 4, 5, 13 & 14 are rejected under 35 U.S.C. 112, first paragraph, because the specification does not reasonably provide enablement for "1,000 *microfluidic reactors*". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The specification (P3/[0044] & Figs. 1, 2) is not enabling because it does not clearly state how 1,000 reactors and channels are arranged via an upstream channel or channels as recited in Claim 1. Although a microfluidic system comprising 1,000 microfluidic reactors may theoretically exist, a theory or idea is descriptive material which may not be patentable.

In addition, viewing at Fig. 1 although the reactors 2 & 4 may have been arranged in parallel, it appears that the reactors 2 & 5 are in series, not in parallel. Further, it is unclear if the resistance of each of the upstream channels of all the reactors is at least 10 times (Claim 1) or 100 times (Claim 4) larger than the resistance of the downstream channel or channels is referring to a percentage of the resistance (or ratio) or actual numerical values of the resistance.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13 & 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 13, it is unclear if Applicant is trying to claim dependency on Claim 1 or not. If Claim 13 is independent of Claim 1, it is advisable to revise the claim to include all the limitations of Claim 1.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 4 & 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (WO 01/28670).

Regarding Claims 1, 4 & 5, Allen et al. teach a microfluidic system (e.g., microfluidic mixer, P3/L19-20 & Fig. 1 (100)) comprising:

- first and second fluid supply sources (e.g., first fluid and second fluid, respectively, P13/L19-20 & Fig. 6 (602, 604)),
- the first and second supply sources supplying microfluidic reactors arranged in parallel (e.g., mixers, P13/L22-23 & Fig. 6 (606)) via an upstream channel or channels (see annotated arrows indicating flow pattern in Fig. 6 below), said upstream channel or channels positioned before the microfluidics reactors,
- the reactors each having at least one downstream channel which is positioned after the reactors (see annotation in Fig. 6 below); and
- the microfluidic reactors are all identical (see identical reactors 606 as shown in Fig. 6).

Regarding the resistance of its upstream channel at least 10, 100 times larger than the downstream channel, it is noted that the channel width b (upstream channels) is smaller than the exit channel width m or s (downstream channels), see Fig. 2a below. Therefore, while mixing fluids having same characteristics and the surface of each channels and reactors are made of same material with same surface smoothness and dimensions, it will display the flow resistance of all the upstream channels of the reactors is higher than the flow resistance in the down stream channels.

Although Allen et al. do not explicitly teach regarding flow resistance, said limitations are directed to processing of the microfluidic device where the limitation relies on fluid dynamics variable as well as reactor design variables which must take into account for changes in the fluid resistance. The variables, such as mass density, velocity, velocity vectors, energy needed to drive the fluid, volume, pressure, temperature, viscosity, as well as design of the reactor such as size of the reactor, pipe sizes, types, etc. Consequently, said limitations are given little patentable weight. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the channel dimensions to increase the resistance of upstream channels at least 10, 100 times larger than the resistance of the downstream channels to change the flow rate to modify mixing and reaction rate of fluids.

It is further noted that the desired flow resistance is a variable that can be modified, among others, by varying the dimensions of the flow channels. For that reason, the flow resistance would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without

showing unexpected results, the flow resistance cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the structure of Allen et al. to obtain the desired flow resistance of its upstream channels is at least 10 times or 100 times larger than the resistance of the downstream channel or channels (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

With respect to 1,000 microreactors, Allen et al. shows in Fig. 6, a plurality of "reactors" connected together. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to connect at least 1,000 microfluidic reactors to study multiple reactions in parallel.

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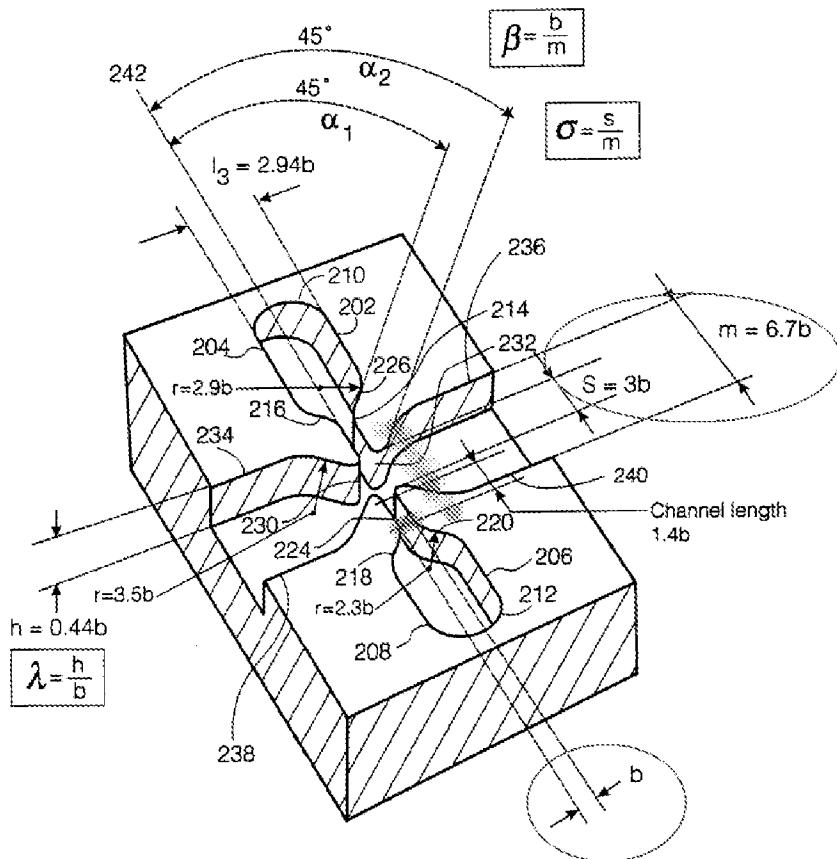
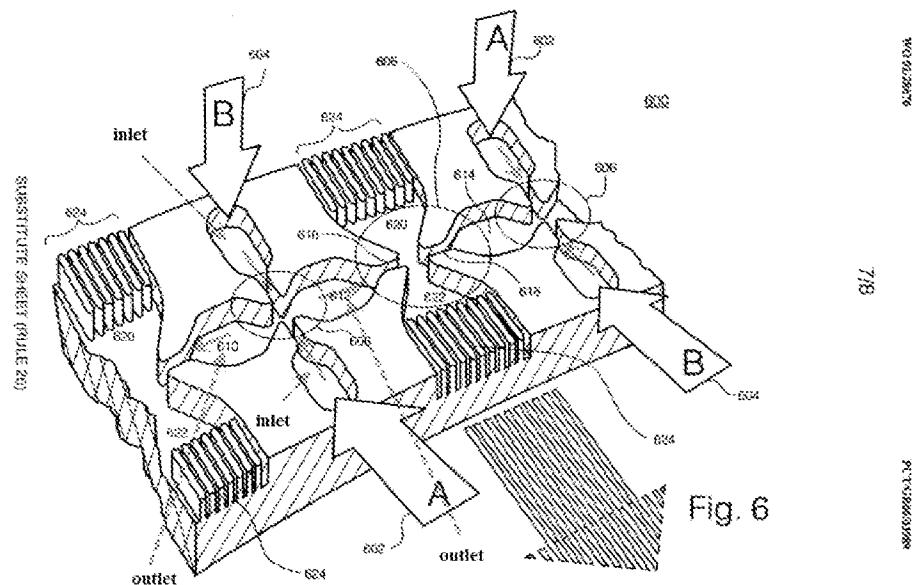


Fig. 2a



NEW GROUND(S) OF REJECTION

The following new grounds of rejection are presented for review on appeal.

Claims 13 & 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (WO 01/28670) and further in view of Ghosh et al. (US 5993750).

Regarding claims 13 & 14, Allen et al. fail to teach the device comprises at least 3 layers.

Ghosh et al. teach a microfluidic system (e.g., integrated micro-ceramic chemical plant, Abstract & Fig. 1 (10)), wherein the microfluidic system comprises at least the following 3 layers:

- an inlet/outlet layer (20) comprising inlet channels (e.g., passageways, C3/L36 & Fig. 2 (12, 14) for first and second fluid supply source and at least one outlet channel (e.g., through-holes, C4/L55 & Fig. 2 (13, 15));

- a connecting layer (30) comprising a plurality of side channels (Fig. 3a (24, 26)) with varying diameter and/or length (see Fig. 3a); and
- a microfluidic layer (40), which comprises microfluidic reactors (e.g., reaction chambers, C3/L47 & Fig. 4a (44, 46, 48)) which are connected to the connecting channels via a port (e.g., through hole 28) and through the connecting channels are in fluid connection with the inlet and outlet channels of the inlet/outlet layer (see Figs. 1-4).

Regarding Claim 14, Ghosh et al. further disclose the microfluidic system wherein the system comprises a plurality of connecting layers connecting a plurality of microfluidic layers to a single inlet/outlet layer (see Fig. 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to manufacture the device in separate layers, as taught by Ghosh et al., to minimize cost of manufacturing from one piece of material. In addition, it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlincman*, 168 USPQ 177, 179.

(10) Response to Argument

In response to appellant's arguments regarding 35 U.S.C. 112, first paragraph rejection, although a microfluidic system comprising 1,000 microfluidic reactors may theoretically exist, a theory or idea are descriptive material which may not be patentable. Further, appellant has failed to demonstrate actual or constructive reduction to practice.

Appellant's arguments with respect to rejections in view of Anderson et al. & Ghosh et al. have been considered but are moot in view of the new ground(s) of rejection.

With respect to arguments regarding Allen et al. fail to teach resistance, Fig. 6 has been annotated to note Examiner's view of inlets & outlets. Although the reference is silent on resistance, the specification details on the dimensions of the device. See annotation in Fig. 2a showing the inlet width "b" is narrower than the outlet width i.e., "3b", "6.7b", which would reads on the inlet having higher resistance than the outlet, assuming all other variables are constant.

With respect to 1,000 microreactors, Allen et al. shows in Fig. 6, a plurality of "reactors" connected together. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to connect at least 1,000 microfluidic reactors to study multiple reactions in parallel.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section (9) above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) Reopen prosecution. Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) Maintain appeal. Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

/D. K./
Examiner, Art Unit 1773

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1773

A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:

/Gregory L Mills/
Supervisory Patent Examiner, Art Unit 1700

Conferees:

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1773

/Patrick Joseph Ryan/
Supervisory Patent Examiner, Art Unit 1726